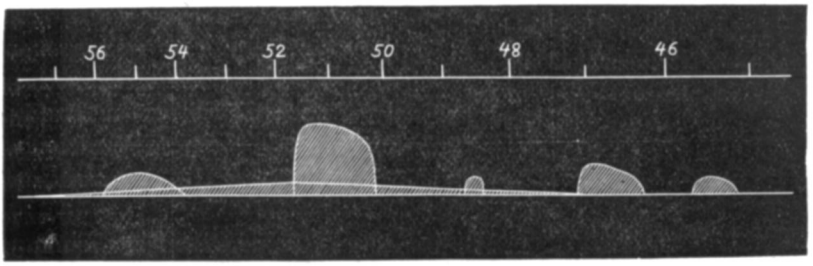
VISIBLE SPECTRUM OF COMET *c*, 1893 (BROOKS).

By W. W. Campbell.

The spectrum of this comet possesses several peculiarities, which can be most satisfactorily explained by means of the accompanying intensity curve:



The horizontal line in the figure is the line of reference. The long flat curve just above it represents the narrow continuous spectrum of the comet's nucleus, yielded, largely at least, by reflected sunlight; and the distance of any point in that curve from the reference line represents the intensity of the continuous spectrum at that point. Similarly, the short and sharply curved lines represent the bright bands which cross the continuous spectrum at right angles and extend a very considerable distance from each side of it. The bright bands are yielded by the incandescent gases which surround the nucleus and form the head of the comet.

The yellow band at wave-length 554, the green band at 515 and the blue band at 470 are the three hydrocarbon bands seen in nearly all comets. The first one of these bands presents its usual appearance; but the second and third bands are narrower, and very much more sharply limited on their violet sides than I have seen them in any other comet. Indeed, both edges of these two bands are equally sharp and straight, and the edges towards the red are not much brighter than the edges towards the violet.

There is also a line or narrow band near 487, and another band near 455, as shown in the intensity curve, and both edges of these bands are straight.

In 1871 Harkness* observed a very faint band at 455 in

* *Washington Observations* for 1870, Appendix II.

ENCKE'S comet, which is possibly identical with that in the present comet. In 1879 VON KONKOLY* observed a faint band in BRORSEN'S comet at wave-length 4823; and in the same comet CHRISTIE and MAUNDER† observed the same band to be "in the neighborhood of the blue band of alcohol at wave-length 4835." However, at about the same time, COPELAND and LOHSE‡ observed the brightest part of the blue band in that comet to be at 4696. It is scarcely possible that the band in BRORSEN'S comet is the same as that at 487 in the present comet. In no other cases, so far as I know, have bands been seen in the vicinity of 487 and 455. Further, I believe that in previous spectra only one band at a time has been observed visually§ in the region 487 to 455, which in the present spectrum contains three.

H. W. VOGEL'S photograph of the cyanogen flame‖ shows a strong group of lines in the vicinity of 456. I think it very probable that they account for the origin of the comet band 455.

The band at 487 is too faint to observe except with a wide slit; but it is of nearly uniform brightness, and appears to be no wider than the slit opening. It is probably a line rather than a band, and the nearness of it to the hydrogen Hβ line at 4862 suggests that the line may be due to hydrogen in the comet. This view is further supported by the fact that none of the recent investigations of the spectra of carbon compounds appear to locate a line in that place. But it must not be considered that the presence of free hydrogen in this comet is established.

The table below contains the measures made upon the brightest places in the bands. The results for the first two nights are only

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* *Astronomische Nachrichten*, Vol. 95, pp. 193-96.

† *Monthly Notices R. A. S.*, Vol. 39, pp. 428-30.

‡ *Monthly Notices R. A. S*, Vol. 39, p. 430.

§ In Comet *Wells*, 1882, Dr. Huggins photographed broad lines near 4600 and 4700.

‖ *Sitzungsberichte der Akad. Wiss., Berlin*, 1888, p. 526.

roughly approximate, having been obtained just as daylight was coming on.

October 17.	October 18.	October 25.	November 2.
Yellow band	Yellow band	Yellow band	554
Green band	Green band	Green band	515
488	488	4864	4862
Blue band	Blue band	Blue band	470
45	455	455	4557

November 3, 1893.

PRELIMINARY NOTE ON A MECHANICAL THEORY OF COMETS.

By J. M. Schaeberle.

In my paper on "A Mechanical Theory of the Corona," written three years ago, the concluding paragraph begins as follows:

"The hypothesis, favored by some astronomers, that the matter now revolving about the Sun in cometary orbits was once ejected from the Sun is, according to the Mechanical Theory, rendered extremely probable, and it would not be difficult to bring forward many strong arguments to support this view, and to account for many apparent changes of form in cometary matter."

Lately, various data (especially those given by my large coronal photographs of the last eclipse) have become available, the character of which is such that no apology is needed for presenting my views on the nature of comets at this time, especially as this new theory of comets is a strictly logical consequence of the mechanical theory of the corona.

Direct observations of the Sun's immediate surroundings demonstrate the presence of masses of matter ejected from the Sun with very great velocity. That this matter is not of a uniform density seems to be plainly proved by the evidence of the eclipse photographs. The prominences, for instance, rise to certain limiting heights, corresponding to certain definite initial velocities